REMARKS

Claims 1-25 are in this application and are presented for consideration. By this Amendment, Applicant has amended claims 1-23.

Applicant has added new independent claims 24 and 25 according to the allowable subject matter noted in the rejection. Specifically claim 24 is a combination of features found in claims 1 and 5 and claim 25 is a combination of features found in claims 1, 8 and 10. It is Applicant's position that new independent claims 24 and 25 are allowable as now presented.

Claims 5-7, 16 and 21 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Applicant has amended claim 5 paying close attention to the Examiner's remarks. It is Applicant's position that claim 5 as now presented is clear and satisfies the requirements of the statute.

Claims 1-4, 8, 9, 11-15, 18-20, 22 and 23 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Vignola (U.S. 5,895,531) in view of Burger et al. (DE 19826259 A1 corresponding to U.S. 2002/0100420).

The present invention relates to a plant for vacuum metallization of objects treated in batches comprising a housing partially containing a discharge electrode and/or a diffuser. A vacuum chamber is provided. The housing is located at an approximately central position of the vacuum chamber when the housing is arranged inside of the vacuum chamber. Applicant has discovered that conventional techniques of placing the housing with the discharge electrode

tangent to a wall of the vacuum chamber fails to adequately deposit a protective polymer film on each of the products that are placed in the vacuum chamber. Applicant has found that this disadvantageously requires that the products be repeatedly subjected to the protective polymer film applying process to ensure that the products are adequately covered with the protective polymer film. This disadvantageously decreases product efficiency. Applicant has discovered that placing the housing partially containing the discharge electrode and/or the diffuser at a central position within the vacuum chamber ensures that the products to be treated are adequately covered by the polymer coating so that the polymer coating does not have to be applied repeatedly to the products. This significantly increases manufacturing efficiency as well as the quality of the protective film applied to the products.

These features and treatment speed advantages are neither taught nor suggested by the prior art as a whole, including Vignola and Burger et al. The references as a whole fail to teach and fail to suggest the combination of features as claimed. The prior art fails to suggest the novel combination of a housing partially containing a discharge electrode and/or a diffuser that is located at a substantially central position of a vacuum chamber when the housing is arranged within the vacuum chamber. This advantageously ensures that the polymer coating is adequately applied to each of the products to be treated. This significantly increases manufacturing efficiency while dramatically increasing the quality of the polymer coating applied to each of the products.

Vignola takes a completely different approach from the present invention. Vignola discloses a plant for the treatment of products in batches for metallization and deposition of a

protective polymer film. The plant comprises a vacuum chamber with a cylindrical extension and a horizontal axis. A carriage which supports the part-carrying device is inserted in the vacuum chamber. An elongated cavity is formed by an opening in the side wall of the vacuum chamber. The cavity is positioned in the peripheral zone of the vacuum chamber and substantially outside the main volume thereof. The cavity contains the high-voltage electrode consisting of a conducting bar and a monomer spraying device. The conducting bar is located tangent to the wall of the vacuum chamber.

Vignola fails to teach and fails to suggest the combination of a housing containing a portion of a discharge electrode and/or a diffuser that is located at a substantially central position of a vacuum chamber when the housing is arranged inside the vacuum chamber. At most, Vignola merely discloses that a high-voltage electrode and a monomer spraying device are located within a wall of a vacuum chamber. This disadvantageously provides each product subjected to the deposition process with an inadequate coating, which requires that the products be subjected to the deposition process several times to ensure that each product is sufficiently and properly coated. This significantly reduces the treatment speed of the products, which dramatically reduces manufacturing efficiency. In contrast to Vignola, the housing containing part of the discharge electrode and/or diffuser is located centrally in the vacuum chamber. This advantageously ensures that each product to be treated is properly coated with a polymer coating. This advantageously provides a higher manufacturing efficiency compared with the device disclosed in Vignola. Vignola fails to provide such manufacturing efficiency advantages since Figures 4, 7 and 8 clearly show that the electrode and spraying device are located in the

side wall of the vacuum chamber.

Instead of being concerned with a high-voltage electrode and a monomer spraying device located within a vacuum chamber wall, Burger et al. discloses that plasma is generated from the top of a vacuum chamber where the plasma generator (microwave antenna 15) is arranged. The plasma is then diffused into the vacuum chamber and distributed by magnets 16. The vacuum chamber is then divided into two areas by a screen 22 such that in one area plasma is present while in the other area plasma is not present. However, Burger et al. fails to teach and fails to suggest the combination of a housing containing a portion of a discharge electrode and/or a diffuser that is centrally located within a vacuum chamber when the housing is arranged in the vacuum chamber.

The teachings of Vignola and Burger et al. fail to suggest a discharge electrode, a diffuser and a housing extending parallel to a longitudinal axis when the discharge electrode, the diffuser and the housing are arranged in a central position of the vacuum chamber. Burger et al. merely discloses a housing for the purpose of preventing the formation of plasma in undesired locations of the vacuum metallization chamber. However, the arrangement of the housing of the present invention has an entirely different purpose and is based on an entirely different technology than that of Burger et al. The present invention is based on the discharge electrode technology for the generation of plasma. In contrast to the present invention, the device of Burger et al. is based on the use of microwaves and magnets. In fact, the purpose of the housing provided in the present invention is keep the plasma concentrated around the electrode, which extends along the housing and is at least partly located in the housing. This

advantageously allows the plasma generated by the electrode to interact in a more efficient way with the monomer molecules distributed by the diffuser. As such, the purpose and function of the housing of the present invention is completely different from the screen 22 disclosed in Burger et al.

The person skilled in the art would not have considered Burger et al. as a pertinent reference for improving the device of Vignola. Vignola is concerned with the problem of making plasma generation and the coating of the objects in a vacuum chamber more efficient. Burger et al. is not concerned with such a problem since the screen 22 of Burger et al. is provided for preventing plasm from entering a specific area of the vacuum deposition chamber. The screen 22 of Burger et al. fails to contribute to the interaction between the plasma and any fluid substance distributed into the chamber by a diffuser. In contrast to Burger et al., the present invention is concerned with the problem of making interaction between the plasm and the fluid substance on the one side, and between the fluid and the objects on the other, more efficient. This problem is solved in the present invention by defining a small volume within the housing which entirely or partly surrounds the diffuser and/or the discharge electrode. Plasma is generated in this protected volume of the present invention and then diffused into the entire vacuum chamber.

Burger et al. fails to provide any suggestion for a housing that extends along a longitudinal axis of a vacuum chamber as claimed. Burger et al. only discloses that screens 22 can be provided in recipient 12 so that the screens prevent the formation of a plasma in a portion of recipient interior 21. However, Burger et al. is void of any teaching that the screen

22 extends along an axis of the vacuum chamber 12. Figures 1 and 3 of Burger et al. do not show the screen 22. At most, Burger et al. discloses that the screen 22 may be arranged on the ceiling of the vacuum chamber near the microwave antenna 15 without extending downwards along the axis of the vacuum chamber. In contrast to Burger et al., the housing of the present invention contains at least a portion of the discharge electrode and/or the diffuser and extends in a direction parallel to a longitudinal axis of the vacuum. As such, the prior art as a whole takes a different approach than the present invention.

The references fail to provide any suggestion of using the teachings of Burger et al. to modify the device of Vignola. Vignola clearly teaches that the polymerization gun is arranged in a cavity that is outside of the vacuum chamber and communicates with the interior of the vacuum chamber through a side opening. As such, the person of ordinary skill in the art is provided with the clear teaching that in order to achieve a more uniform and durable polymerization and protective coating thickness on the exterior of the metallized surface of the products treated within the vacuum chamber, it is essential in Vignola to arrange the diffuser and the plasma generating electrode outside the vacuum chamber volume such that the vaporized monomer must first pass through the plasma glow created by the conductive rod before entering the vacuum chamber. However, Burger et al. fails to provide any suggestion for modifying the arrangement disclosed in Vignola. The teachings of Burger et al. do not suggest how to shape the longitudinally extended cavity containing the polymerization gun in order to improve the deposition of the protective coating on the products. As such, Vignola and Burger et al. take a different approach and fail to provide any suggestion for the

combination of features claimed. Accordingly, Applicant respectfully requests that the Examiner favorably consider claim 1 as now presented and all claims that depend thereon.

Claim 17 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Vignola and Burger et al., and further in view of Dunham (U.S. 2001/0054391). Although Dunham teaches a method and apparatus for providing uniform gas delivery to substrates, the references as a whole fail to suggest the combination of features claimed. Specifically, Vignola and Burger et al. provide no suggestion or teaching for the combination of a housing containing a portion of a discharge electrode and/or a diffuser that is centrally located in a vacuum chamber when the housing is positioned inside the vacuum chamber. As such, the references together do not teach or suggest the combination of features claimed. One of ordinary skill in the art is presented with various concepts, but these concepts do not provide any direction as to combining the features claimed. All claims define over the prior art as a whole.

Favorable consideration on the merits is requested.

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Attached: Petition for One Month Extension of Time

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SHOULD ANY OTHER FEE BE REQUIRED, THE PATENT AND TRADEMARK OFFICE IS HEREBY REQUESTED TO CHARGE SUCH FEE TO OUR DEPOSIT ACCOUNT 13-0410.